and Mr. Larmuth a research upon the "Physiological Action of certain Vanadium Compounds." The number of students in the various departments of the College during the session just closed has been—Arts, Science, and Law, 415; Medicine, 175; Evening Classes, 900; making a total—allowing for double entries—of 1,450, being an increase of seventy on the number registered during the session of 1875–76.

LEEDS.—On Saturday the prizes and certificates awarded to the students at the termination of the third session of the Yorkshire College of Science were distributed by Lord Frederick C. Cavendish, the President of the College. Thoroughly gratifying reports of progress were made by all the professors. Not only has a site been obtained for the erection of permanent buildings, but an architect has been appointed to prepare plans and superintend the erection of the buildings. The first step has been taken to provide what we have all along advocated, a complete curriculum in literature as well as in science, by the appointment of Mr. Marshall as classical professor, and it is hoped that in a very short time a professor of modern literature will also be added to the staff. Liberal contributions have already been made towards the great expenses required to start the institution, and the University Extension Committee have handed over the whole of the funds of which they had been made administrators in connection with Leeds. Still to attain anything like efficiency the sum already obtained must be doubled. It is the people of Yorkshire who will mainly benefit by this new institution, and we hope it will not be difficult to convince them that it is both their interest and their duty to provide the greater portion of the funds required.

DURHAM.—At a recent Convocation the following degrees and licences were conferred in connection with the University:—B.Sc.: John Thomas Dunn, Mather Scholar. Associates in Physical Science: Edwin Cooke, John Richard Hutchinson Williamson.

PARIS.—The reconstruction of Charlemagne College, one of the most celebrated national colleges in Paris, has just been finished. The fitting-up of the buildings has begun, and they will be ready by October next. This college was established after the Revolution in the Hotel d'Anville, rue St. Antoine, which had been purchased from Anne de Montmorency by the Cardinal of Bourbon, and bequeathed by him to the Jesuits, then in hostility with the University.

A large number of houses having been pulled down in the Quartier Latin to make room for the Boulevard St. Germain, the works for the enlargement of the School of Medicine have been begun, and will be completed before the Exhibition. The expense will be 2,838,000 fr.

NOTES

THE varied and cultured tastes of the Emperor of Brazil are unusual even among private individuals, and probably without a parallel among his own limited class; his activity and eagerness for knowledge are astonishing. While in Paris, as we stated at the time, he was present at almost every scientific meeting of any importance, and in London this interest in science manifests itself quite as strongly. He has attended every meeting of the Royal Society since his arrival, was present at Mr. A. R. Wallace's lecture, carefully inspected the Science School at South Kensington, called the other day on Mr. Crookes, visited Dr. Siemens on Tuesday and Mr. Spottiswoode on Wednesday, and indeed has conversed with almost every man of science in London who has been doing any original work during the past few years. These visits are not mere formalities, for the Emperor is not satisfied until he masters whatever new research is submitted to him. On Tuesday he was made an honorary member of the Anthropological Institute and of the Royal Historical Society. Were the Emperor to stay here for some time we believe his presence would have a distinct influence on the public recognition of science; and if there were any one in this country in a similar station who took an equally real interest in science, we believe it would be all the better.

UNDER the auspices of the Sanitary Institute, Dr. Richardson, F.R.S., will deliver a lecture at the Royal Institution, Albemarle Street, on Thursday next, at 4 P.M., "On the Future of Sanitary Science in relation to Political, Medical, and Social Progress." We hope to give a verbatim report of this lecture in next week's number.

THE last meeting of the Royal Society previous to the recess was held last Thursday.

WE regret to see that Poggendorff's name has been entirely suppressed in the title-page of the new volume of the *Annalen*. The journal now edited by Borchardt still bears Crelle's name, and our *Philosophical Magazine* still keeps the names of Tilloch, Nicholson, and Thomson on its title-page. A similar allusion to the man who has made the *Annalen* what they are, would have been a better tribute to his memory than the short account of his life which closes what we must now call the last volume of *Poggendorff's Annalen*.

THE twenty-sixth meeting of the American Association for the Advancement of Science will be held at Nashville, Tennessee, commencing August 29, 1877. The president at this meeting will be Prof. Simon Newcomb; the permanent secretary is Prof. F. W. Putnam.

THE Geologists' Association have arranged for an excursion into Derbyshire on Monday, July 23 and five following days, under the direction of the Rev. J. M. Mello, Prof. Boyd Dawkins, and Mr. Rooke Pennington.

THE Select Committee to which the Ancient Monuments' Bill was referred met on Monday, when Sir John Lubbock was chosen chairman. The Committee meets again on Monday next, when evidence will be taken.

AT the meeting of the Royal Geographical Society on Monday, the last of the three lectures on scientific geography arranged for this session was given by Mr. A. R. Wallace, "On the Comparative Antiquity of the Continents." The object of the lecture was to establish the comparative antiquity of continents by an examination of the living and extinct animals found in each, and the lecturer came to the general conclusion that the main divisions of the earth had been nearly the same from the earliest period. The Emperor of Brazil was present during the lecture.

IN our report of the Anniversary Meeting of the Geographical Society it was stated that the Society contemplated organising an African Exploration Fund. The Society, it is known, has taken no share in the International African Association founded by the King of the Belgians; while doing everything to forward the views of that association, it seems to be of opinion that England ought to carry out African exploration independently. The Prince of Wales has become patron of the African Fund, and a special committee has been appointed, with the president of the society as chairman, the society having given a special donation of 500*l*. A map accompanying the programme of the scheme shows how large an area has been explored by British travellers, and several routes in Eastern Africa are suggested for exploration or careful examination. A comparison has been made of the length of each journey in Africa in a few recent instances, with the cost of making it. It appears that the total expense of despatching a well-equipped exploratory expedition from England may be roughly reckoned at the rate of 1*l.* 10*s.* for each geographical mile of country travelled over in Africa, supposing the expedition to return to the place whence it set out. In through journeys the rate is in many cases nearly twice as great. The aggregate length of the seven specified routes is about 7,700 geographical miles; consequently, the total cost of the proposed explorations, at the above rate, would amount to about 11,550*l*. No doubt many besides fellows of the society will be willing to help forward this new scheme. In connection with this we may here state that the International African Commission has concluded its labours. It has decided that the organisation of stations in Africa belongs to the Executive Committee. The principal object of these stations will be the suppression of the slave trade. It has also been decided that an expedition shall leave Zanzibar in the direction of Lake Tanganyika. The King of the Belgians has been re-elected president of the Commission.

Trübner, of Strassburg, publishes this month the first number of a new *Zeitschrift für physiologische Chemie*, edited by Prof. Hoppe-Seyler, of Strassburg and other eminent German chemists. The purpose of the journal is to keep together such original papers in physiological chemistry as are now scattered over various chemical, physiological, and medical journals. The new *Zeitschrift* will be published every two months.

It is stated that in a field near Cologne the Colorado potato beetle has been found in every stage of development.

In connection with the agitation in favour of planting the streets and squares of Manchester with trees, and protecting the suburban vegetation, which is being carried on by the Field Naturalists and Archæologists' Society of that city, a paper by Mr. R. H. Alcock, F.L.S., containing some curious information, was read at the last meeting of the Society. Mr. Alcock has experimented for the last twenty-five years in planting trees in the vicinity of his mill, situated in Bury, a smoky manufacturing town, a few miles from Manchester. He finds that the plane (*Platanus orientalis*), which is so successful in London, will not grow at all in Lancashire smoke even with careful culture. But on the other hand he has been very successful with the beech, sycamore, birch, wych elm, and Turkey oak. The lime, however, is the tree chiefly recommended : indeed, Mr. Alcock says of it that he is absolutely certain it will grow well in the Manchester thoroughfares if properly planted. If the Manchester people are enabled to walk *unter den Linden*, they will have reason to thank the Society which is making such commendable efforts to solve the problem in question.

It is just 140 years since the National Library of Paris was made public. The area of the building has been enlarged more than twenty times since that, and a scheme is now being planned for isolating the building from every other house.

An important French work has just appeared at Geneva—"Le Massif du Mont Blanc. Étude sur sa Constitution géodésique et géologique, sur ses Transformations et sur l'état ancien et moderne de ses Glaciers," by E. Viollet Le Duc, with 112 illustrations, and a map on the scale of 1 : 40,000. The work is the result of seven years' exploration, during which the author has set himself to map and describe with all possible accuracy, the characters of the rocks and of the soil, the successive beds of glaciers, the positions of moraines, the forms of the *cônes de déjection*, as well as the general aspect of this great upheaval. The map, based on the former maps of Capt. Mieulet, on the well-known relief of Mont Blanc constructed by Bardin, on the surveys of Forbes, on the work of Alph. Favre, and on careful surveys by the author himself, is indeed a remarkable work, scientifically and artistically. After many attempts the author has given up the idea of representing the relief by level curves, and has returned to the old graphic system under a light corresponding to that of the sun about 10 o'clock on a summer morning. In this way the relief of the locality is so perfectly represented on the map as really to deceive the eye. The geological description deserves the attention of all geologists.

Mr. E. G. Ravenstein, F.R.G.S., read an elaborate paper at the Statistical Society on Tuesday evening last week, on the populations of Russia and Turkey. The former of these Empires has 84,584,482 inhabitants, the latter only 25,986,868, or, including Egypt, Tripoli, and Tunis, 43,408,900. The population of Roumania is 4,850,000, of Servia 1,352,500. The population of Russia increases at the rate of 1·1 per cent. per annum, the increase amongst the Jews being at least double what it is amongst the Christians. With respect to Turkey there exist no data for calculating the increase, though it is most probable that the dominant race does not increase at all, a fact accounted for by vicious practices, and by the sacrifices demanded from it for the defence of the empire. Some curious facts were commented with respect to the proportions between males and females. Throughout Asiatic Russia and in a considerable portion of European Russia the male sex preponderates. The same fact has been noted in Roumania, in Greece, and in other parts of Europe. The author thus summed up the results of his investigations :—In the Russian Empire there are 100 Russians to every 50 members of other nationalities, and 100 Christians to every 16 Mohammedans and Pagans. In Turkey, on the other hand, 100 Turks have opposed to them 197 members of other nations and 100 Mohammedans, 47 Christians.

Mr. Stanford has just published sheet No. 1 of a large-scale map of the seat of war in Europe. It exhibits with great minuteness the region on both sides of the Danube where operations are being at present carried on, and extends southwards as far as the latitude of Philipopolis. It is admirably executed, and will enable a reader to follow the movements of the belligerents with complete satisfaction. Mr. Stanford also publishes a bird's-eye view, by Maclure and Macdonald, of the seat of war in Asia and Europe from Kurdistan, much better executed than the generality of similar maps.

Further details appear in the American papers of the recent destructive earthquake and wave on the west coast of South America. A Lima correspondent states that at about 8·30 on the night of May 9, a severe earthquake shock, lasting from four to five minutes, moved the entire southern coast, even reaching down as far as Antofagasta. The first shock was succeeded by several others of less intensity, and the sea, receding from the shore, seemed to concentrate its strength for the fearful and repeated attacks it made upon the land. It left Callao and proceeded southward. At Mollendo the railway was torn up by the sea for a distance of 300 feet, since repaired ; and a violent hurricane afterwards set in from the south, preventing the approach of all vessels, and unroofing the houses of the town. At Arica the shocks were very numerous, and caused immense damage in the town, the people flying to the Morro for safety. The sea was suddenly perceived to recede from the beach, and a wave from ten feet to fifteen feet in height rolled in upon the shore, carrying before it all that it met. Eight times was repeated this assault of the ocean. Iquique is in ruins. The movement was experienced there at the same time, and with the same force. Its duration was exactly four minutes and twenty seconds. It proceeded from the south-east, directly from the direction of the Ilaga. The town of Tarapatt, twenty-five leagues inland, and the villages of Rica, Matella, and Canchones were more or less damaged. The shock of earthquake was especially severe at Chanavaya. In some spots the earth opened in crevices of fifteen metres in depth, and the whole surface of the ground was changed. At least 200 persons were killed. At Antofagasta the atmosphere was illuminated by a red glare, supposed to proceed from the volcano of San Pedro de Atacama, a few leagues in the interior. The sea completely swept the business portion of the town during four hours. At Huanillion the wave which succeeded the earthquake was nearly sixty feet in height. Mexillones was visited by a tidal-wave sixty-five feet in height. Two-thirds of the town were completely obliterated In connection with the so-called "Tidal Wave" of the Pacific, Mr. Manley Hopkins writes to yesterday's *Times* :—About the 1st of May last the great crater of Kilauea, on the flank of Mauna-Loa, had become active. On the 4th rather severe shocks of earthquake were felt at the Volcano House. At 3 P.M. that day a jet of lava was thrown up to the height of about 100 feet, and afterwards other jets, to the number of fifty, perhaps, were in operation. Subsequently jets of steam issued along the line formed by a fissure four miles in length, down the mountain side. On the 5th, an observing party finding the disturbance lessened, descended into the vast crater. On the plain which forms the floor of the crater a mamelon had been thrown up 1,400 feet in diameter and 700 feet in height. Fire and scoria spouted up in various places. Pele's hair, vitreous filaments formed in the volcano, abounded. Things returned to a quiescent state. Between 4 and 5 A.M. of the 10th an oscillation of the sea was observed at Hilo, on the east coast of the great southern island of Hawaii. At a quarter before 5 the great "earthquake wave" struck the village. The greatest difference between the crest and the trough of the wave was here, and it measured 36 feet. On the opposite side of the island, in Kealakekua Bay, where Cook died, the measurement was 30 feet. In other localities the difference varied down to 3 feet. The regurgitations of the sea were violent and complex, and continued through the day. The great wave seems to have struck all the islands at the same time without reference to position. The height of the waves was nowhere so great as at Hilo. In 1868 a great earthquake wave destroyed Arequipa and Arica; 30,000 lives were lost at that time. Allowing five hours for the difference of longitude between those ill-fated towns and Honolulu, and supposing that the centre of the seismic action was rightly placed, the wave on that occasion, 1868, was calculated to have travelled the 5,000 miles between Arica and Honolulu in twelve hours, or at the rate of 446 miles an hour.

THE shock of an earthquake visited the district between Aix-la-Chapelle and Cologne at about 9 A.M. on Sunday. The movement was from south-west to north-east, and lasted from three to fifteen seconds. The vibration resembled that caused by a heavy goods train. The *Cologne Gazette* remarks that the last earthquake in the Rhine district occurred on November 17, 1868, two days after a considerable eruption from Vesuvius had commenced

AT a recent meeting of the Christchurch (N.Z.) Philosophical Institution, Dr. Haast gave an account of the discovery of remarkable ancient rock paintings in the Weka Pass Ranges. Some of them are fifteen feet long; they represent animals of foreign countries, weapons and dresses of semi-civilised people; underneath are characters like those of the Tamil language, and those on the ancient hill found in the North Island.

THE great Moscow Polytechnic Museum was opened on June 12 by an extraordinary meeting of the Society of Friends of Natural Science.

THE Irkutsk newspaper *Siberia* announces that on April 28, at 9.30 A.M., an earthquake was felt at Irkutsk. The shock was very short and rather strong.

THE second fascicule of the sixth volume of the *Memoirs* of the Kazan Society of Naturalists contains the annual report of the Society. The most important work done by the Society was a geological exploration of the permian and carboniferous deposits along the banks of the Volga, between Stavropol and Syzran, by M. Stuckenberg, and of the banks of the Kama in the Vyatka government, by M. Zaytseff.

THE additions to the Zoological Society's Gardens during the past week include a Patas Monkey (*Cercopithecus ruber*) from West Africa, presented by Mr. Edward Poulson; a Yellow Baboon (*Cynocephalus babouin*) from West Africa, presented by Mr. H. E. Walters; a Purple Kaleege (*Euplocamus horsfieldi*) from the North-west Himalayas, presented by Mr. John Ditmas; an Imperial Eagle (*Aquila imperialis*), European, a Barrabands Parrakeet (*Polytelis barrabandi*) from New South Wales, deposited; seven Spotted-billed Ducks (*Anas pœcilorhyncha*), seven Chilian Pintails (*Dafila spinicauda*), eight Summer Ducks (*Aix sponsa*), two Bronze-winged Pigeons (*Phaps chalcoptera*), a Geoffroy's Dove (*Peristera geoffroii*), bred in the Gardens; a Hippopotamus (*Hippopotamus amphibius*), born in Holland, purchased.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, May 31.—"The Physical Properties of Homologues and Isomers," by Frederick D. Brown, B.Sc.

When we attempt to compare the physical properties of a series of compounds presenting very similar chemical properties, we find, that although our knowledge regarding one or two members of the series is tolerably complete, it is very restricted concerning the others.

Among the alcohols of the $C_nH_{2n+1}OH$ series, for example, there are two—methyl and ethyl alcohols—with whose physical properties we are well acquainted, but when we pass to the other members of this series we find, that with the exception of numerous determinations of density and boiling-point, experiments have been limited to the measurements of expansion which have been carried out by Kopp, Pierre and Puchot, and others.

In order to supply this want, I have undertaken a series of experiments, the first of which are here noticed.

The density, expansion, and vapour-tension of propyl and isopropyl iodides have been measured with the greatest care; the chief difficulty to be overcome being the impurity of the liquids themselves, more than a kilogramme of each was specially prepared and dried by means of phosphoric anhydride; it was then submitted to fractional distillation, about 500 grammes of perfectly pure iodide being thus obtained; this was again distilled and collected in about four portions, each of which formed the subject of a series of experiments. The results obtained with all these portions agreed most satisfactorily, showing that when the substance is prepared with care, the error due to impurity is well nigh obviated.

The following table gives the results in such a form as to show that when the tensions of the saturated vapours of both iodides are equal, the densities and consequently the molecular volumes are unequal.

Vapour-tension in millims.	Boiling-point of normal propyl iodide.	Boiling-point of isopropyl iodide.	Density of normal propyl iodide.	Density of isopropyl iodide.	Difference between densities.
200	62°·37	50°·50	1·66704	1·64590	0·02114
300	73·51	61·33	1·64493	1·62359	0·02134
400	81·95	69·70	1·62808	1·60646	0·02162
500	88·84	76·44	1·61446	1·59246	0·02200
600	94·70	82·11	1·60250	1·58068	0·02182
700	99·83	87·13	1·59221	1·57035	0·02186
760	102·63	89·86	1·58670	1·56497	0·02196

It will be seen that this is in contradiction to Kopp's law, but that it is in accordance with the modern dynamical hypotheses on the constitution of matter, since the instability of the secondary iodide may be due to the greater *vis viva* of its molecules, which in turn would cause an increase of the mean distance between the molecules.

I may here mention that I have made a very complete series of experiments on the vapour-tension of normal propyl alcohol. The curve representing these observations intersects that which expresses the tensions of normal propyl iodide, so that whereas at 760 millims. the iodide boils at 102°·5 and the alcohol at 97°·3, at 370 millims. they boil at the same temperature, viz., 79°·5, and at 120 millims. the boiling-point of the iodide is only 49°·5, whilst that of the alcohol is 56°.

This fact, which probably arises from the much greater latent heat of propyl alcohol, obviously renders useless all attempts to derive the boiling-points from the constitution of chemical com-